

Name: \_\_\_\_\_

## Final Exam Study Guide

### Algebra 1A 2017

**\*We will be completing this study guide in parts. If you know how to complete all problems on this Study Guide AND complete additional suggested items, you will do very well on the Final Exam.**

**\*If you choose to skip a night of studying and practice, you probably will not do as well as you would like!**

**\*Remember that you should also practice ADDITIONAL problems offered, actively PARTICIPATE in all classroom REVIEW, and attend TUTORIAL!**

**\*Twenty minutes per night starting TONIGHT!**

**\*Please answer all written responses in at least TWO complete sentences using at least THREE algebraic terms. Be sure to echo the prompts.**

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### Part One: Expressions, Integers, Distributive Property

#### Extra Practice: p.54 #3-12, p.110 #23-34

1. Name one similarity and one difference between an expression and an equation.


**2. Writing Algebraic Expressions:** Write an algebraic expression or equation for each.

a. five less than  $g$

b. twice a number  $b$  increased by six

c. four multiplied by the sum of nine and  $y$

d. two more than  $x$

e.  $a$  decreased by fifteen

**3. Evaluating Expressions:** Evaluate each expression if  $x = 1$ ,  $y = 2$  and  $z = 4$ .

a. $xyz$	b. $2x - y + z$
c. $3(x - y + z)$	d. $\frac{3x + y}{5}$

**4. Order of Operations:** Simplify each expression completely.

a. $5 - 3 + 6$	b. $15 + 6 \div 3 - 4$
c. $5 + 3^3(1)$	d. $\frac{14 - 2(3) + 2}{15 \div 3}$

**5. Integer Operations:**

a. $4 + 5 =$	b. $4 + (-5) =$	c. $-4 + 5 =$
d. $-4 + (-5) =$	e. $4(5) =$	f. $(-4)(-5) =$
g. $(-4)(5) =$	h. $4(-5) =$	i. $\frac{20}{-5} =$

**6. Subtracting Integers:** Rewrite each subtraction problem as an addition problem. Then, simplify:

a. $5 - 4$ Addition: _____  Answer: _____	b. $5 - (-4)$ Addition: _____  Answer: _____
c. $-5 - 4$ Addition: _____  Answer: _____	d. $-5 - (-4)$ Addition: _____  Answer: _____

**7. Comparing:** Write  $<$ ,  $>$ , or  $=$  in each blank. (Hint: Simplify each side of the blanks first.)

a. $-9$ _____ $-8$	b. $-8 - 2$ _____ $-11$	c. $5 - 2$ _____ $-3$
d. $ 5 $ _____ $ -5 $	e. $ -6 $ _____ $ -7 $	f. $(-8)(-2)$ _____ $(8)(2)$

8. Give an example of two like terms and explain HOW they are like terms.

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**9. Distributive Property Simplification:** Simplify each completely using the distributive property. You **MUST** show your work with **ALL** distributive property steps.

a. $2(10 + 7)$	b. $5(7 - 2)$	c. $6(y - 1)$
d. $-4(8 - 10)$	e. $x(6 + y)$	f. $(3 + u)9$

**10. Mental Math with Distributive Property:** Rewrite each number inside the parentheses so that it can be written as a sum of two simpler numbers. Then, use the distributive property to simplify.

**You must show ALL work and distributive property steps.**

<p><i>Example: <math>5(202)</math></i>  <math>= 5(200 + 2)</math>  <math>= 5(200) + 5(2)</math>  <math>= 1000 + 10</math>  <math>= 1010</math></p>	a. $7(42)$	b. $3(106)$
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**11. Simplifying Expressions:** Simplify each expression as completely as possible.

a. $-1 + 10 + 8 - 9$	b. $5(-3x + 2)$	c. $-(n - 5)$
d. $-4(5f + 3)$	e. $2(-4h + 9) + 7h$	f. $5x + 3x$
g. $5x - 3x$	h. $-5x - 3x$	i. $-5x - (-3x)$

**12. Error Analysis:** Given the expression:  $4y - 7 - 3y + 6$ ,

*Student X simplified in the following way:*

$$= 4y - 3y - 7 + 6$$

$$= (4 - 3)y - 7 + 6$$

$$= y - 13$$

Identify and explain the error:

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Simplify the expression correctly. Show all work:

### Part Two: Word Problems

**Extra Practice: p.163 #9-14, p.243 #14-16**

13. Dean collects markers, colored pencils and pens. He has a certain number of each writing utensil.

a. Define a variable to represent the number of markers Dean has.	b. Dean has three more colored pencils than markers. Write an expression for the number of colored pencils Dean has, using your variable from part a.
c. Dean has three times as many pens as colored pencils. Write an expression for the number of pens Dean has, using your variable from part a.	d. Write AND SIMPLIFY an expression for the total number of markers, colored pencils and pens combined that Dean has. BOX your final answer.

14. Aaliyah and Kenneth go to CVS. Aaliyah buys seven bags of chips and spends two dollars on candy. Kenneth buys five bags of the same chips and spends eight dollars on pencils. Aaliyah and Kenneth spent exactly the same amount of money. What is the cost of one bag of chips?

a. Read and annotate the word problem.

b. Define a variable that makes sense for the situation. Use the magic word.

c. Write and solve an equation that describes the situation.

d. Check via substitution. Show your work.

e. Write your answer in a complete sentence, echoing the question.

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f. How much money did Aaliyah spend?

15. Nazy leaves school at 3:15 pm. Jabulani notices that Nazy forgot his Algebra study guide and leaves at 3:45 pm to catch up to him. He travels at an average speed that is thirty mph faster than Nazy and catches up to him at 4:15 pm. How fast is Nazy traveling? How fast is Jabulani traveling?

a. Read and annotate the word problem. What type of DRT Problem is this?

b. Write the GENERAL equation for this type of problem.

c. Define a variable.

d. Fill in the DRT Table below.

	rate	time	Distance

e. Using the GENERAL equation from #2 and your table, write and solve an equation for the situation.

f. Answer the question in a complete sentence.

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16. Caleb and Jerin are one hundred thirty-five miles apart. Caleb leaves at noon, traveling at a speed of sixty miles per hour, and Jerin leaves at one pm the same day, traveling at a speed of forty-five miles per hour. The boys are traveling directly towards each other. At what time will they meet up?

a. Read and annotate the word problem. What type of DRT Problem is this?

b. Write the GENERAL equation for this type of problem.

c. Define a variable.

d. Fill in the DRT Table below.

	rate	time	Distance

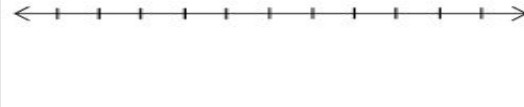
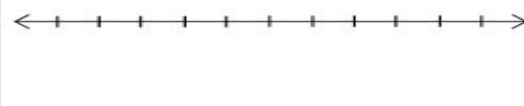
e. Using the GENERAL equation from #2 and your table, write and solve an equation for the situation.

f. Answer the question in a complete sentence.

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**17. Real World Inequalities:** Write and graph an inequality or a compound inequality for each situation.

<p>a. In order to ride the roller coaster, you must be at least four feet tall.</p> <p>Inequality: _____</p>	
<p>b. Members of the Young Readers Book Club must be older than ten and younger than eighteen.</p> <p>Inequality: _____</p>	

### Part Three: Properties, Probability and Multiple Choice

#### Extra Practice: p. 110-111 #35-38, 45-66

<p><b>18. Matching:</b> Write the CAPITAL LETTER of the property that each example illustrates.</p>											
<p style="text-align: center;"><b>Property Word Bank:</b></p> <table style="width: 100%;"> <tr> <td>A. Inverse Property of Multiplication</td> <td>B. Inverse Property of Addition</td> </tr> <tr> <td>C. Commutative Property of Addition</td> <td>D. Associative Property of Addition</td> </tr> <tr> <td>E. Multiplication Property of Zero</td> <td>F. Distributive Property</td> </tr> <tr> <td>G. Commutative Property of Multiplication</td> <td>H. Associative Property of Multiplication</td> </tr> <tr> <td>I. Identity Property of Multiplication</td> <td>J. Identity Property of Addition</td> </tr> </table>		A. Inverse Property of Multiplication	B. Inverse Property of Addition	C. Commutative Property of Addition	D. Associative Property of Addition	E. Multiplication Property of Zero	F. Distributive Property	G. Commutative Property of Multiplication	H. Associative Property of Multiplication	I. Identity Property of Multiplication	J. Identity Property of Addition
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i. $6(1) = 6$ _____	j. $7(\frac{1}{7}) = 1$ _____										

**19. Simplifying with Properties:** Simplify each expression, then write which property or properties you utilized.

<p>a. <math>-7(1) =</math> _____</p> <p>Property: _____</p>	<p>b. <math>8(\frac{1}{8}) - 2(3 + y)</math></p> <p>Property: _____</p> <p>Property: _____</p>
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20. You are flipping a two-sided coin. Find the following probabilities.

a. $P(\text{heads}) =$	b. $P(\text{tails}) =$
c. $P(\text{heads, then heads again}) =$	d. $P(\text{heads, then a 1}) =$

21. Names are being drawn out of a hat to see who wins a raffle! The names in the raffle are: Emmanuel, Jerin, Caleb, Jabulani, Nazzy, Kenneth, Aaliyah, Farrah, Christina, Da'Mere, Lisa and Dean. Once a person's name has been drawn, they cannot be drawn again.

*Remember, every new question is a new raffle.*

a. $P(\text{Lisa}) =$	b. $P(\text{Ms. Chall}) =$
c. $P(\text{Christina, then Farrah}) =$	d. $P(\text{a boy}) =$

22. There are ten drinks left in a cooler: five waters, three sodas and two iced teas.

Find each probability. *Remember, all the drinks are back in the cooler for each new question.*

a. $P(\text{water}) =$	b. $P(\text{soda}) =$
c. $P(\text{water, then soda}) =$	d. $P(\text{iced tea, then iced tea again}) =$

23. The probability of me rolling a one on a six-sided number die is  $\frac{1}{6}$ , meaning I should roll a 1 once every six times. I roll the die six times and never get a one. How does this experiment show the difference between theoretical and experimental probability? Write at least one complete sentence that shows your understanding of these two terms.

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24. Write the CAPITAL LETTER of each correct answer.

a. _____	Which of the following is NOT equivalent to $-3(5 + 6)$ ? A. $-3(5) - 3(6)$ B. $-3(11)$ C. $-3(5) - (-3)(6)$ D. $-33$
b. _____	Which of the following illustrates the COMMUTATIVE property? A. $8y + 3y = (8 + 3)y$ B. $8y + 3y = 3y + 8y$ C. $8(y + 3) = 8y + 8(3)$ D. $8y + 3y = 11y$
c. _____	Which type of DRT problem is represented by the situation below? <i>Frieda leaves her apartment at seven am and travels at a speed of fifteen miles per hour to work. She leaves work at four pm, traveling at a speed of ten miles per hour back home. Her trip home takes a half an hour longer than her trip to work.</i> A. catch up      B. round trip      C. opposite directions      D. none of the above
d. _____	In the problem above, if we let Frieda's travel time to work = t, which expression represents her travel time back home? A. t      B. t + 10      C. t + 15      D. $t + \frac{1}{2}$
e. _____	Percent change is equal to: A. $\frac{\text{New} - \text{Original}}{\text{New}} \times 100$ B. $\frac{\text{Original} - \text{New}}{\text{New}} \times 100$ C. $\frac{\text{Original} - \text{New}}{\text{Original}} \times 100$ D. $\frac{\text{New} - \text{Original}}{\text{Original}} \times 100$
f. _____	The simple interest formula is: A. $I = \frac{p}{rt}$ B. $I = rt$ C. $I = p + r + t$ D. $I = prt$

g. _____	<p>What is the difference between solving equations and solving inequalities?</p> <p>A. In an inequality, you must flip the inequality sign if you multiply or divide by a negative number.</p> <p>B. You do not use inverse operations to solve inequalities.</p> <p>C. In an inequality, you must flip the inequality sign if you add or subtract a negative number.</p> <p>D. There is no difference.</p>
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h. _____	<p>What is the first step to solving the inequality below?</p> $\frac{g}{-4} - 6 > -15$ <p>A. multiplying both sides by negative four</p> <p>B. adding six to both sides</p> <p>C. subtracting six from both sides</p> <p>D. dividing both sides by negative four</p>
i. _____	<p>For the graph of the inequality: <math>m &gt; -12</math></p> <p>A. the solutions are all positive                      B. the solutions are all negative</p> <p>C. the circle is open                                      D. the circle is closed</p>
j. _____	<p>Which of the following is NOT a solution of <math>-6 &lt; k \leq -2</math>?</p> <p>A. -6      B. -5      C. -3      D. -2</p>
k. _____	<p>Which of the following values is NOT a solution of <math>b &lt; -1</math> OR <math>b &gt; 3</math>?</p> <p>A. -2      B. 2      C. 4      D. 5      E. all of the above are solutions</p>
l. _____	<p>A function is:</p> <p>A. a relation that has only one input</p> <p>B. a relation in which each output has only one input</p> <p>C. a relation in which each input has only one output</p> <p>D. a relation with multiple inputs</p>

m. _____	The parent linear function is: A. $\frac{y_2 - y_1}{x_2 - x_1}$ B. $y = x$ C. $y = x^2$ D. $Ax + By = C$
n. _____	Which of the following equations is NOT in the standard form of a linear equation? A. $y = -3x + 2$ B. $3x + y = 2$ C. $y = 2$ D. $3x - y = 2$
o. _____	The line $y = -4$ has: A. a positive slope      B. a negative slope      C. a slope of 0      D. an undefined slope

### Part Four: Equations

#### Extra Practice: p.191-192 #6-11, 13-25

**25. Solving Equations:** Solve each equation. Show all work and box your final answer.

*Recommended: Check your work via substitution.*

a. $5a = -30$	b. $b + 2 = -1$
c. $-2(c - 4) = 20$	d. $12 + \frac{d}{-3} = 2$

e.  $\frac{6}{7}e = -6$

f.  $8(2f - 1) - 10f = 2f - 8 + 4f$

g.  $3(7g - 3) + 5 - 7g = 6g + 28$

h.  $\frac{5}{3}h - 2 = 8$

i.  $7i - 3 + 2i = 3(3i - 1)$

j.  $-6j = -3$

26. What is the major goal of solving an equation?

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**27. Justifying Steps while Solving an Equation**

<b>a. Given Equation:</b> $5(-4y - 7) = -5y + 10$	<b>Property</b>
$-20y - 35 = -5y + 10$	<hr/>
$-15y - 35 = 10$	<hr/>
$-15y = 45$	<hr/>
$y = -3$	<hr/>

<b>b. Given Equation:</b> $4(3y + 2) = 5y - 3 + 6y$	<b>Property</b>
$12y + 8 = 5y - 3 + 6y$	<hr/>
$12y + 8 = 11y - 3$	<hr/>
$y + 8 = -3$	<hr/>
$y = -11$	<hr/>



## Part Five: Percent Change, Interest, Proportions

### Extra Practice: p. 192-193 #30-35, 42-44

**28. Percent Change Word Problems:** Show your work. Round to the nearest hundredth, if necessary.

<p>a. Emmanuel has twenty-two pencils at the beginning of final exam prep period. At the end of the prep period, he has fourteen pencils. What is the percent change in number of pencils Emmanuel has?</p>	<p>b. Fifty people attend the first outdoor movie showing at the lake. After more publicity, two hundred people attend the second outdoor movie showing at the lake. What is the percent change in attendance?</p>
<p>c. Gail weighs seven pounds when she is four months old. She gains ninety-eight pounds in the next eight months. What is her percent change in weight?</p>	<p>d. A used bookstore has one thousand books in stock. The bookstore sells two hundred books one week, and purchases one hundred more books to put in stock. What is the percent change in the number of books in the store?</p>

**29. Interest Calculations: Show all work and box your final answers. Round answers to the nearest cent.**

a. Claudia deposits five hundred and six dollars into a savings account with a four percent simple *annual* interest rate.

i. How much interest will Claudia earn after three years? \_\_\_\_\_

ii. What will Claudia's total balance be after five years? \_\_\_\_\_

b. Mr. Lippman charges nine hundred dollars on a credit card with a three percent monthly interest rate.

i. What will Mr. Lippman's total credit card balance be after one year? \_\_\_\_\_

ii. After one year, Mr. Lippman pays three hundred dollars towards his bill. What will his new balance be? \_\_\_\_\_

iii. Assuming no additional charges or payments, what will Mr. Lippman's credit card balance be two years after his initial deposit?

\_\_\_\_\_

**30. Proportions: Solve each proportion. Show all work (do not cross-multiply!). Round to the nearest hundredth, if necessary.**

a.  $\frac{3}{2} = \frac{x}{12}$

b.  $\frac{-5}{3} = \frac{10}{v}$

c.  $\frac{2}{a+10} = \frac{1}{5}$

d.  $\frac{h}{h+5} = \frac{2}{7}$

### Part Six: Inequalities

#### Extra Practice: p.244-245 #1728, 31-39, 41-49

**31. Solving and Graphing Inequalities:** Solve each inequality; then graph on the number lines provided. Your answers must be written as inequalities (ex:  $x > 7$ ).

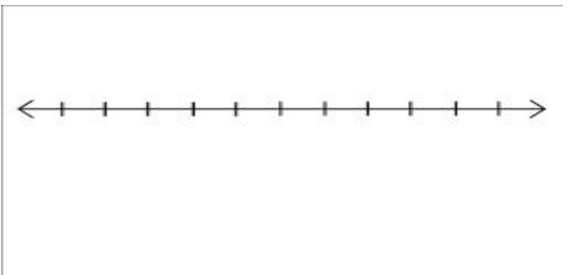
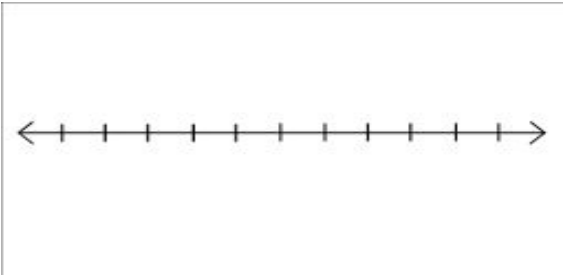
a.  $a - 6 > -10$



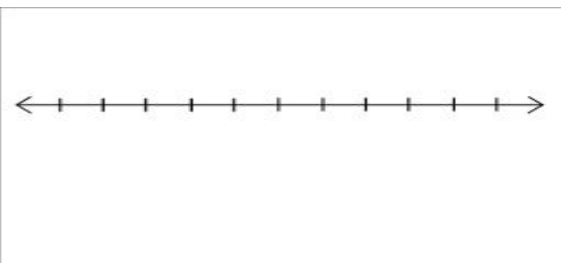
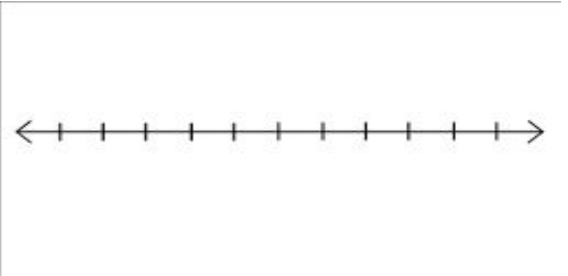
b.  $\frac{b}{-3} \leq 9$



**32. Compound Inequalities with OR:** Solve and graph each compound inequality. Be sure to number each number line properly and write your answers as compound inequalities. (Ex:  $x < 2$  OR  $x > 5$ ).

<p>a. <math>a + 5 \leq 6</math> OR <math>5a &gt; 15</math></p>	
<p>b. <math>4(r + 2) &lt; 12</math> OR <math>5 - r &lt; -1</math></p>	

**33. Compound Inequalities with AND (6 points each):** Solve and graph each compound inequality with AND. Be sure to number each number line properly and write all answers as compound inequalities (Ex:  $-4 < g \leq 12$ ).

<p>a. <math>10 &lt; d + 3 \leq 12</math></p>	
<p>b. <math>-12 &gt; -3x &gt; -15</math></p>	

## Part Seven: Functions and Linear Equations

### Extra Practice: p. 365-367 #11-13, 14-18, 20-23, 30-36

**34. Relations and Functions:** Determine whether each relation is a function. Explain your reasoning in a complete sentence.

<p>a.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">x</th> <th style="padding: 5px;">y</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">0</td> <td style="padding: 5px;">1</td> </tr> <tr> <td style="padding: 5px;">1</td> <td style="padding: 5px;">2</td> </tr> <tr> <td style="padding: 5px;">1</td> <td style="padding: 5px;">3</td> </tr> </tbody> </table> <hr style="border: 0; border-top: 1px solid black; margin: 10px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 10px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 10px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 10px 0;"/>	x	y	0	1	1	2	1	3	<p>b.</p> <div style="text-align: center; margin-bottom: 20px;"> </div> <hr style="border: 0; border-top: 1px solid black; margin: 10px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 10px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 10px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 10px 0;"/>
x	y								
0	1								
1	2								
1	3								

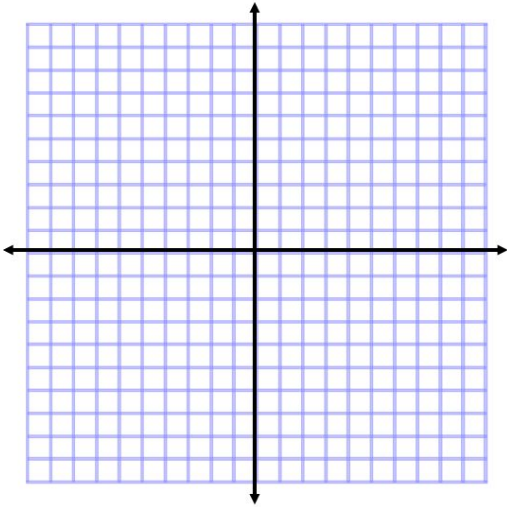
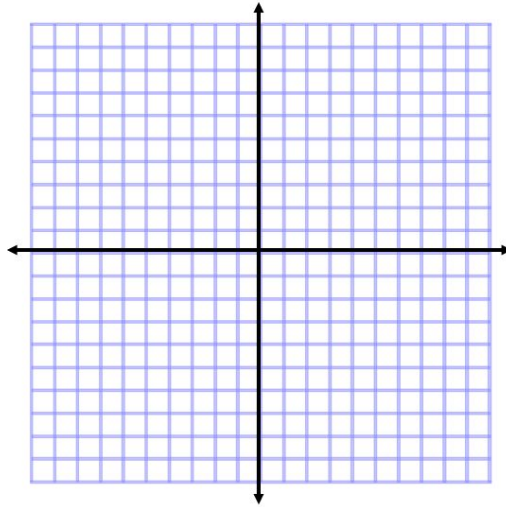
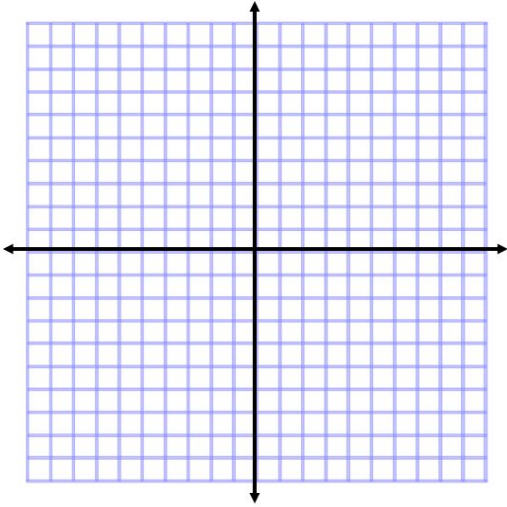
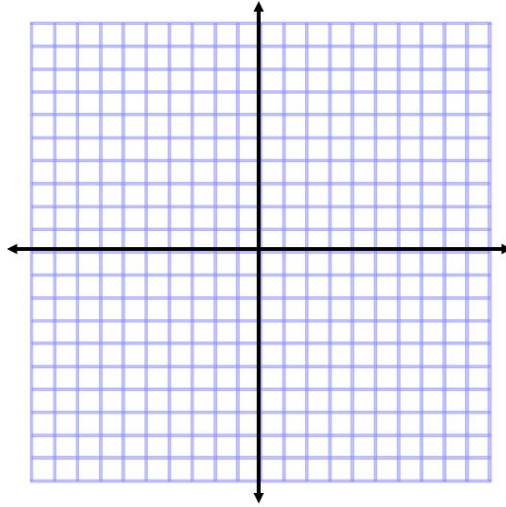
**35. Slope:** Find the slope of the line between the given points. Reduce fractions, if possible.

<p>a. <math>(4, -2)</math> and <math>(4, 7)</math></p>       	<p>b. <math>(1, -7)</math> and <math>(5, 5)</math></p>       
<p>c. <math>(-1, 7)</math> and <math>(-3, -5)</math></p>       	<p>d. <math>(8, 3)</math> and <math>(-4, 3)</math></p>       

**36. Function Notation:** Find the outputs given the function:  $f(x) = -x - 12$

a. $f(-2)$	b. $f(9h - 1)$
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**37. Graphing Lines:** Graph each line. Be sure to NAME and EXTEND your lines!

a. $y = -x + 1$ 	b. $y = x$ 
c. $4x - y = -8$ 	d. $y = -1$ 

**38. Writing Equations of Lines:** Write the equation of each line in slope-intercept form.

a. with y-intercept of -7 and slope of 1

b. that passes through (4, -8) and (5, 2)

c. that is parallel to  $y = \frac{3}{4}x - 3$  and passes through (4, 1)

d. that is perpendicular to  $y = \frac{1}{5}x$  and passes through (-1, 2)